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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/196,185	11/20/1998	MYUNG-KOO HUR	6192.0052.AA	8847

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EXAMINER
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QI, ZHI QIANG

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 09/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/196,185

Applicant(s)

HUR ET AL.

Examiner

Mike Qi

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 July 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 1-3, 6-13 and 18-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4, 5, 14-17 and 21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 8-254680 (Kubo) in view of US 6,219,125 (Ishikura et al) and US 6,008,065 (Lee et al).

Claim 4, Kubo discloses (col.3, line 42 - col.4, line 17 and Fig.2) that the metal lines (wire) (such as gate lines) (113) made of molybdenum (Mo), and have a second supplementary layer (115) made of the Mo-alloy located on the metal wire, and such metal layer has a good chemical resistance and protection to prevent the external influence, and it is especially suitable for protecting the metal layer from chemicals.

Kubo does not expressly disclose the supplementary layer located either on or under the entire wire layer and made of either Mo-nitride or Mo-alloy nitride, and a transparent electrode electrically connected to the wire layer such as gate lines.

However, Ishikura discloses (col.3, line 34 - col.4, line 46; Figs 1-5) that in each metal electrode (3) (it also is a wire), the adhesive layer (11) (it also is a wire) preferably comprise a metal Mo or alloy or the metal nitride (so that the adhesive layer 11 would be Mo-nitride or Mo-alloy nitride, and located under the wire 3, and the metal electrode 3 also comprises a material of

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Mo or Mo-alloy), and a layer of metal nitride would further improve the adhesiveness between the glass substrate and the metal electrodes (3); and a protective layer (13) (it also is a wire) preferably comprise a metal Mo or alloy or the metal nitride (so that the protection layer 13 would be Mo-nitride or Mo-alloy nitride, and located on the wire 3, and the metal electrode 3 also comprises a material of Mo or Mo-alloy), and a layer of metal nitride would increase a surface roughness of the metal electrodes (3), thus enhancing an electrical conduction with the transparent electrodes (5), and the transparent electrode (5) is electrically connected with the metal electrode (3).

The US 6,486,494 (Jeong et al) is based on the continuation patent US 6,008,065 (Lee et al) filed on Nov.21,1996.

Lee discloses (col.4, line 55 - col.5, line 67; Fig.11) that using a first metal layer (22) and a second metal layer (24) to form the gate electrode (also is a wire), and the second metal film (24) acts as a capping film to prevent the Al alloy (also is metal alloy) from contacting the ITO film, and the Fig.11 shows the ITO (transparent conductive film, also is a transparent electrode) connected to the wire (double layered wire such as the gate pad 22 and 24).

Lee indicates (col.5, lines 57-67) that such double layered wire prevents the occurrence of a battery effect, and the second metal layer functions as the capping film that would protect the gate wire.

Therefore, it would have been obvious to those skilled in the art at time the invention was made to arrange a wire layer made of metal or metal-alloy and a supplementary layer on or under

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the wire layer using metal nitride or metal-alloy nitride as claimed in claim 4 for improving the corrosion resistance, improving the adhesiveness and protecting the wire layer.

Claim 5, Kubo discloses (abstract and Fig.2) that the supplementary layer (115) comprising tungsten.

3. Claims 14-17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art (AAPA) in view of JP 8-254680 (Kubo) and US 6,219,125 (Ishikura et al) .

Claims 14 and 21, AAPA (col.1, lines 11-22) indicated that in general, an LCD has:

- a substrate (insulating substrate, e.g., glass);
- a gate wire formed on the substrate;
- a gate insulating layer covering the gate wire;
- a semiconductor layer formed on the gate insulating layer;
- a data wire formed on the gate insulating layer;
- a passivation layer formed on the data wire;
- an ITO pixel electrode formed on the passivation layer and connected to the data wire (the drain electrode) through the contact hole are formed thereon.

AAPA does not expressly disclose the data wire is made of either metal or metal alloy, and a supplementary data wire is located either on or under the entire data wire and made of either metal nitride or metal alloy nitride.

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However, Kubo discloses (col.3, line 42 - col.4, line 17 and Fig.2) that the metal lines (such as gate lines) made of molybdenum (Mo) (metal), and have the second supplementary layer (115) made of the Mo-alloy and located on the metal wire, and such metal layer has a good chemical resistance and protection to prevent the external influence, and it is especially suitable for protecting the metal layer from chemicals.

Ishikura discloses (col.3, line 55 - col.4, line 46; Figs.1-5) that in each metal electrode (3) (it also is a wire), the adhesive layer (11) (it also is a wire) preferably comprise a metal Mo or alloy or the metal nitride (so that the adhesive layer 11 would be Mo-nitride or Mo-alloy nitride, and located under the wire 3, and the metal electrode 3 also comprises a material of Mo or Mo-alloy), and a layer of metal nitride would further improve the adhesiveness between the glass substrate and the metal electrodes (3); and a protective layer (13) (it also is a wire) preferably comprise a metal Mo or Mo-alloy or the metal nitride (so that the protection layer 13 would be Mo-nitride or Mo-alloy nitride, and located on the wire 3, and the metal electrode 3 also comprises a material of Mo or Mo-alloy), and a layer of metal nitride would increase a surface roughness of the metal electrodes (3), thus enhancing an electrical conduction with the transparent electrodes (5).

Therefore, it would have been obvious to those skilled in the art at time the invention was made to arrange a wire layer made of Mo or Mo-alloy and a supplementary layer on or under the wire layer using Mo nitride or Mo-alloy nitride as claimed in claims 14 and 21 for improving the

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corrosion resistance, improving the adhesiveness and enhancing the electrical conduction with electrodes.

Claims 15-17, Kubo discloses (abstract; col.3, line 42 - col.4, line 17; Fig.2) that the supplementary layer (115) comprising tungsten, and the supplementary gate layer (115) is located on the gate wire (113) and made of Mo-alloy, and such metal layer has a good chemical resistance and protection to prevent the external influence, and it is especially suitable for protecting the metal layer from chemicals.

Therefore, it would have been obvious to those skilled in the art at time the invention was made to use a supplementary layer as claimed in claims 15-17 for achieving high corrosion resistance and especially for protecting the metal layer from chemicals.

#### ***Response to Arguments***

4. Applicant's arguments filed on Jul.23, 2003 have been fully considered but they are not persuasive. .

##### **Applicant's *only* arguments art as follows:**

1) The reference Jeong does not qualify as prior art according to the priority date on Nov.20, 1997.

2) The references are not directed to protecting data wire or gate wire from etchant (hydrochloric acid and nitric acid) used for patterning an ITO layer.

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Examiner's responses to Applicant's **only** arguments are as follows:

1) The US 6,486,494 (Jeong et al) is based on the continuation patent US 6,008,065 (Lee et al) filed on Nov.21,1996. Lee discloses (col.4, line 55 - col.5, line 67; Fig.11) that using a first metal layer (22) and a second metal layer (24) to form the gate electrode (also is a wire), and the second metal film (24) acts as a capping film to prevent the Al alloy (also is metal alloy) from contacting the ITO film, and the Fig.11 shows the ITO (transparent conductive film, also is a transparent electrode) connected to the wire (double layered wire such as the gate pad 22 and 24). Lee indicates (col.5, lines 57-67) that such double layered wire prevents the occurrence of a battery effect, and the second metal layer functions as the capping film that would protect the gate wire.

2) Kubo discloses (col.3, line 42 - col.4, line 17 and Fig.2) that the metal lines (wire) (such as gate lines) (113) made of molybdenum (Mo), and have a second supplementary layer (115) made of the Mo-alloy located on the metal wire, and such metal layer has a good chemical resistance and protection to prevent the external influence, and it is especially suitable for protecting the metal layer from chemicals. The chemical resistance also means to protect the wire from the etching process, and protecting the metal layer from chemicals also means protecting the wire from etchant.



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***Conclusion***


5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (703) 308-6213 .

Mike Qi  
August 15, 2003.

  
ROBERT H. KIM  
SUPERVISOR  
EXAMINER  
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